U-2 PILOT PHYSICAL MAINTENANCE CONTROL PROGRAM

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U-2 PILOT PHYSICAL MAINTENANCE CONTROL PROGRAM

I. GENERAL

The long range and pre-flight crew control procedures proposed in this manual have as their purpose the maintenance of every pilot in optimal physical and mental conditions at all times. If these conditions are accomplished, an invaluable contribution will have been made toward the safety and well-being of the pilot and to the successful completion of the mission, which is the ultimate goal. Implementation of this suggested program will be a joint effort by the detachment Commander, the squadron flight surgeon, and Project Headquarters. Each project pilot will be dealt with on an individual basis, and the general rules governing the ethics of any medical practice should apply stringently in this program. For instance, any corrective action necessitated by adherence to these controls should be "privileged communication" between the Flight Surgeon, the detachment Commander (when necessary), and the pilot concerned. Appropriate discretion should be used by the Flight Surgeon when informing a pilot, individually, of the corrective actions the surgeon is authorized to take. The crew control procedures implemented for each flight will be made a matter of permanent record by the Flight Surgeon.

II. ANNUAL PHYSICAL EXAMINATIONS

Annual physical examinations for Project U.S. U-2 pilots will be conducted at the Lovelace Foundation for Medical Research, Albuquerque, New Mexico. Appointments will be arranged on a yearly basis by Headquarters personnel. Physical examinations subsequent to the 1962 review will be arranged, if possible, so as to complete the evaluation within sixty days prior to the individual's birth date, unless this would result in a time interval of less than ten months between the 1962 and 1963 evaluations. In this event, the

examination will be delayed until at least a ten month interval has elapsed. If operational considerations preclude this time limitation, it can be adjusted accordingly, so as to accomplish this physical examination as close to the specified dates as possible.

III. PHYSIOLOGICAL TRAINING

A. Physiological training will be accomplished in accordance with Air Force Regulation 50-27, and AFSC Supplement One to AFR 50-27, dated 27 April 1961, and will include partial pressure suit indoctrination as specified in the referenced regulation.

B. Edwards Air Force Base pressure chamber and school will be utilized for this training. 25X1C

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IV. PHYSICAL FITNESS AND/OR EXERCISE PROGRAM

The U.S. Air Force 5BX plan is highly recommended as one means whereby the Flight Surgeon can give simple but effective guidance to the pilots in maintaining a high level of physical competence. Even though this plan is not recommended primarily as a weight reduction program it is an effective way of maintaining physical competence once it is attained. Pilots will be strongly encouraged to avail themselves of the gymnasium facilities at Edwards main base. Categorization of physical fitness or competence is somewhat nebulous. Therefore, no specific requirements will be levied in this area of crew management.

V. WEIGHT CONTROL

Pilots will be weighed as soon after institution of this program as possible, and on a monthly basis thereafter. Measures will be taken to maintain pilots at an ideal

weight at all times. Since the Lovelace Clinic has done extensive studies on the physical competence of these pilots, ideal weight levels will be determined for the pilots, on an individualized basis. This information will be requested by Headquarters, and will be forwarded to the field detachment. Until this information is available, the desirable ranges as set forth by the Subcommittee on Nutrition, Committee on Public Health, Medical Society of the County of New York, from the data of the Build and Blood Pressure Study, 1959, Society of Actuaries, will be used as a guideline in advising the pilots on weight control. These weights are set forth below, measured in pounds, in indoor clothing, for men twenty-five years of age and older. Height is measured with shoes on, with one-inch heels. Estimation of frame of the body is basically a clinical judgment, and should be determined by the local Flight Surgeon.

Height	Small Frame	Medium Frame	Large Frame
5'2"	112-120	118-129	126-141
5'3"	115-123	121-133	129-144
5'4"	118-126	124-136	132-148
5'5"	121-129	127-139	135-152
5'6"	124-133	139-143	138-156
5'7"	128-137	134-147	142-161
5'8"	132-141	138-152	147-166
5'9"	136-145	142-156	151-170
5'10"	140-150	146-160	155-174
5'11"	144-154	150-165	159-179
6'	148-158	154-170	164-184
6'1"	152-162	158-175	168-189
6'2"	156-167	162-180	173-194
6'3"	160-171	167-185	178-199
6'4"	164-175	172-190	182-204

No grounding action will be taken on the basis of these actuary studies. When the individualized studies are obtained, drivers will be expected to maintain the ideal weights as determined for them. Ideal weight plus ten pounds will be considered as an acceptable range. Any pilot weighing less than his ideal weight will be encouraged by the Flight Surgeon to come within the ideal range. No administrative action will be taken as a result of underweight, unless symptoms of malnutrition or physical disease are present. In this event, the driver will be declared medically

disqualified for flying duties. No administrative action will apply to any pilot weighing up to ten pounds in excess of the ideal weight as determined by the Lovelace Clinic, although he will be advised by the Flight Surgeon to reduce to his ideal level. If the weight is between ten and fifteen pounds in excess of the ideal, the driver will be given two months to reduce to a level within his acceptable range. If after this period of time, the pilot's weight is not within his acceptable range, he will be grounded until such time as his proper weight is reached. Any pilot weighing more than fifteen pounds in excess of his ideal weight will be expected to reduce at a rate of a minimum of five pounds per month until his weight reaches the range of acceptable levels. If at any time he fails to show this rate of weight reduction, he will be grounded immediately, and will remain so until his acceptable weight range is accomplished. If, in the opinion of the Flight Surgeon, any grounded pilot fails to make appropriate progress toward a proper weight level, by virtue of disregard for this control program, said pilot can be recommended by the surgeon for release from the Project. Recommendations will be forwarded through the detachment Commander to Headquarters, where the final decision will be made. This action may also be initiated by Headquarters. Grounding action and recision of same shall be accomplished by the local squadron Flight Surgeon, with the approval of the detachment Commander. Approval of Headquarters is not necessary, but notification of such action is requested by telephone and in writing. If the grounded pilot asks for a review of his case, it will be referred to Headquarters, where reviewing action will be taken, and notification of decision made. If at any time, an operational need arises for a grounded pilot, this pilot will fly only at the discretion of the Flight Surgeon -- that is, if in his opinion, said driver would constitute no flying hazard to himself or others; and if it would be in the best interest of successfully accomplishing the mission. If and when reasons for grounding are discovered, in conformance with the above specifications, grounding action will commence immediately and the pilot concerned will be prohibited from participation in flying activities from that date until such time as his weight conforms to the acceptable levels. Grounding action will apply to any and all training and Headquarters directed missions, and will deprive the pilot concerned of any and all monetary benefits which accrue by virtue of flying. Initially, the specific methods for weight reduction will be left to the discretion

of the local Flight Surgeon, since he has the best knowledge of individual driver characteristics. This could include such measures as physical exercises, dietary procedures, or appetite depressants, all of which must be accompanied by motivation on the part of the driver. Assistance desired by individuals will be offered by the Flight Surgeon.

VI. REPORTING

Monthly reports on project pilots will be submitted to Headquarters, summarizing progress, recommendations, and general status of the pilot's physical status. A paragraph in the Commander's report may be used for this purpose. These reports will be reviewed by Project Headquarters' physician and recommendations made accordingly.

VII. PRE-FLIGHT, INFLIGHT, AND POST-FLIGHT CREW CONTROLS

A. Prior to all flights, other than local area, short duration, and low altitude equipment tests, formal crew preparation will be considered a mandatory pre-flight activity. As much advance notice as possible will be given in order that proper dietary and rest requirements may be satisfied. For sorties of ten hours' duration and less, pre-mission crew control may be supervised to the extent deemed necessary by the detachment Commander. For any flight, appropriate physical and mental surveys will be made of the pilot and adequate time allowed for unsupervised and voluntary pre-mission conditioning.

B. Sorties of more than ten hours' duration will require a supervised and controlled pre-mission preparation phase to insure the optimum level of pilot conditioning. While it is not considered necessary to directly supervise every activity of the pilot, his program of activities will be scheduled and monitored during the crew control period. An example of such period is attached for illustration and guidance (see C. below).

1. The following minimum requirements will be satisfied by crew control procedures.

a. During the period 18-24 hours immediately prior to scheduled take-off the pilot's activities will be programmed and directly or indirectly

supervised as appropriate.

b. Environment, sleep, exercise, and diet will be controlled and monitored as necessary.

c. The Flight Surgeon will make an initial survey of the pilot at the beginning of crew control, another just prior to flight, and a final evaluation at the flight's termination.

d. Medication and liquid/food consumption will be prescribed by the Flight Surgeon during pre-mission crew control and throughout the flight.

e. Quarters and dining facilities will be provided where a maximum control of environment and diet can be effected.

2. Crew Control Considerations and Discussion:

a. The objectives of crew control should be kept clearly in mind by the pilots and supervisors when arranging for facilities, scheduling, and living under these procedures. Adequate nourishment, rest, and recreation, free from emotional, mental, or excessive physical stress are the conditions such controls will help achieve. Under field conditions, and even to some extent at the permanent station, some compromises may have to be made from time to time. However, all reasonable efforts should be exhausted to provide the best possible situation in these areas. Established local facilities will be utilized to maximum extent where better accomodations can be obtained, i.e., BOQ, motel, hotel, hospital, gymnasium, etc., until appropriate facilities are provided within the North Base complex; then, these facilities will be utilized when staging is done from North Base.

b. Appropriate facilities for sleeping and eating at forward staging areas will be arranged in whatever manner deemed advisable by the detachment Commander.

C. Sample Crew Control Activities Schedule:

Period prior to take-off	Approx hours	Activity
18-24 hours	1+00 hours	Alert, medical evaluation of selected pilot.
17-23	1+30-7+30	(1) Light exercise (i.e.,golf, swimming, volleyball,gardening, calisthenics, etc.) (2) Relaxed activity of choice at home if desired (i.e., family visit, reading, cards, chess, hobby, etc.)
15:30	1-1:30	Eating (at designated facility).
14:00	1+00	Mission Briefing
13:00	10+00	Preparation for and sleep
3:00	1+00	Toilet, eat, dress, transport, etc.
2:00	+15	Pre-mission medical examination
1:45	+30	Specialized briefing
1:15	1+15	Pre-breathing, dressing, and final briefing.

TAKE-OFF

NOTE: The above is intended to illustrate a typical schedule, outlining type of activities and controls desired in the crew control period. The actual time of day take-off scheduled and the circumstances related to a specific mission will conceivably dictate a revised pre-mission pilot's schedule. The detachment Commander will use his judgement in application of this conditioning program. It should be emphasized that one of the primary concerns of this control program is to reduce the total time-out-of-bed for the mission pilot to a minimum. Even so, in considering a sixteen hour mission, with the controls as outlined, time out of bed will approach

eighteen to nineteen hours. This is a figure which should not be exceeded and should be reduced whenever possible without sacrificing adequate pilot preparation.

D. Medical Evaluation

1. Initial Medical Survey - The pilot will be examined and interviewed by the Flight Surgeon at the onset of the control period. Any physical abnormalities or emotional stresses found which in the opinion of the Flight Surgeon would preclude successful completion of the mission will be justification for not allowing the pilot to proceed.

a. Physical Examination:

(1) Weight (nude)

(2) Blood pressure - sitting, recumbent, standing (after two minutes).

(3) Pulse - before, immediately after, and two minutes after exercise.

(4) Body temperature

(5) Respiration - rate

(6) Brief system review:

(a) Skin - turgor, color, markings.

(b) HEENT - with special emphasis on the ophthalmological examination, oral cavity, mucous membranes, ear canals, tympanic membranes. Valsalva should be checked.

(c) Cardiorespiratory - with clinical evaluation of the lungs and the heart.

(d) Gastrointestinal - clinical evaluation.

(e) Genitourinary - with urinalysis, for specific gravity, albumin, glucose, and microscopic examination.

(f) Musculoskeletal - with particular

emphasis on the spine and the extremities - range of motion, strength.

(g) Metabolic and endocrine - clinical evaluation.

(h) Neurological - deep tendon and superficial reflex responses.

(i) Hematological - hemoglobin.

b. A brief psychiatric evaluation will be accomplished by the Flight Surgeon through a personal interview and should cover these fields of interest:

(1) Recent social relationships and judgments -

(a) In marriage,

(b) With children,

(c) With subordinates,

(d) With peers,

(e) With superiors.

(2) Financial management.

(3) Infractions of discipline, control, and judgment.

(4) Recent personal habits (particularly changes in these habits):

(a) Smoking

(b) Alcoholic intake.

(c) Sleep

(d) Exercises.

(5) Motivation for continuation in special projects.

2. If the Flight Surgeon is not in attendance at the staging area, the pilot will receive a physical examination before leaving the area where the surgeon is available. This evaluation will be made a matter of record.

3. After initial medical examination, the Flight Surgeon will emphasize the importance of proper conduct, adherence to prescribed diet, and scheduled activities. Close attention will be given to sleep requirements. As close to ten hours of sleep as possible prior to the scheduled take-off should be obtained. Sleep during this period may be induced with a sedative prescribed by the Flight Surgeon, who will use his judgment in the choice of drug. Even though controlled sleep will be mandatory for the extended duration missions, it is strongly suggested that all pilots of missions in excess of six hours institute self-imposed restrictions and get a minimum of eight hours' sleep prior to immediate pre-flight preparations. On-base sleeping quarters will be utilized for any mission in excess of ten hours. Facilities for sleep at forward staging areas should be set up prior to arrival of the pilot at the area. The detachment Commander will be responsible for delegating this responsibility in whatever way he deems most feasible and reliable.

4. A final pre-mission medical check will be brief and follow the pattern as shown hereon:

a. Blood pressure - resting.

b. Pulse rate.

c. Nystagmus.

d. Skin turgor and markings.

e. Eosinophil count (if practical).

f. General observations.

Eosinophil counts, both pre- and post-flight, are suggested as one of the simplest means of at least

initiating a study on the physiological stress effects induced by periods of long flight. If facilities were available, more concrete information could be obtained by measuring blood and urinary corticosteroid levels; but in the absence of facilities capable of measuring these values, it is suggested that at least the eosinophil counts be done. Each driver, of course, will serve as his own baseline, and the study should serve only as a simple investigative tool by the Flight Surgeon, and evaluated as such. If this determination proves unworthy of the time and effort involved, it could be discontinued.

5. At the discretion of the local Flight Surgeon, stimulants, either dexedrine or dexamyl tablets, may be made available to the drivers for missions in excess of ten hours. It will be stressed upon the pilots that these are not to be taken unless there is a definite indication for such, and such indication will be explained by the Flight Surgeon. Dosage will be controlled by the Flight Surgeon.

6. For missions of extended duration, (in excess of ten hours), consideration may be given by the Flight Surgeon to the employment of anti-fatigue drugs such as Spartase (Wyeth). However, since this drug is recognized primarily as most beneficial in the therapy and alleviation of chronic fatigue, and not as a prophylaxis against acute fatigue, it will not be utilized in flight at the present time. Too, because of the recognized possible side reactions to this drug, it should be employed initially on a trial basis before any anticipated use of it prior to scheduled missions, to assess each individual pilot's reaction to the drug. Only after an assessment of this nature -- that is, only after it has been demonstrated that the pilot is free from side reactions to this, or any other drug so employed, -- should it be used in attempting to alleviate some of the symptoms of fatigue. The employment of such drugs is only suggested as a possible part of the over-all program of enhancing a pilot's ability to remain physiologically and mentally capable of successfully completing a mission of stressful duration.

7. A post-flight evaluation will be made by the Flight Surgeon at which time the following debriefing questionnaire will be completed:

a. Check any of the following activities in which you engaged during the 24 hour period prior to take-off:

_____Administrative duties (number of hours)_____
_____Flying (number of hours) _____
_____Sports (number of hours) _____
_____Indoor relaxation (number of hours) _____
_____Other (if applicable, indicate) _____

b. Were there any significant factors that adversely affected your physical or mental conditions in the 24 hour period prior to flight? Yes___ No____. If yes, indicate.

c. Did you get adequate rest and sleep in the 48 hours before flight? Yes____No____. If no, explain.

d. How many hours did you sleep during the 24 hour period prior to take-off? ____hours. Upon awakening, were you rested? Yes____No____. If no, explain.

e. Did you feel that the break in your "normal" rest-activity cycle significantly impaired your preparation for flight? Yes____No____. If yes, explain and suggest changes.

f. Did you take sleeping medication prior to sleep in the 24 hour period prior to take-off? Yes____No____. Was it satisfactory? Yes____No____. If no, explain.

g. Did you eat immediately prior to take-off? (Within one hour?) Yes____No____. If yes, indicate foods or liquids taken.

h. Did you use in-flight food? Yes____No____. If yes, indicate type, amount, and time(s) taken in-flight.

(i) Was the in-flight diet satisfactory? Yes___ No____. If no, explain and suggest possible changes.

j. How much in-flight fluid did you actually consume? (1 bottle = 1 pint). Was it adequate in amount, and did it satisfy your thirst? Yes____ No____. If no, explain.

k. Did you experience any difficulty with urination during flight? Yes____No____. If yes, explain.

l. When did you have your last bowel movement prior flight? 1-6 hours____6-12 hours____12-24 hours____.

m. Did you defecate in-flight? Yes____No____. If no, did you have an urge to defecate during flight that was annoying to the extent of serious discomfort? Yes____No____.

n. Did you have adequate time for personal hygiene, briefing, and donning of personal equipment before take-off? Yes____No____. If no, explain.

o. Were any drugs other than sleep medication taken during the 72 hour period prior to take-off? Yes____No____. If yes, what drug was used? _____. What, if any effects were noted in-flight that could be attributed to the action of this drug?

p. Did you use dexedrine, or other drugs, during this flight? Yes____No____. If yes, what drug was used? _____ At what time(s) during flight was it taken?____hours after take-off. Were the effects satisfactory? Yes____No____. If no, explain.

q. Did you at any time suspect or experience any difficulty with the oxygen system that would produce error in your recorded data on the green card? Yes____No____. If yes, explain.

r. Did you have any flight difficulties that may have increased your fatigue or decreased your flying proficiency? Yes____No____. If yes, explain.

s. At any time during the flight did you experience muscle cramps or twitching, muscle or joint

pain, coughing, or a "creepy" sensation on your skin? Yes____No____. If yes, explain.

t. At any time during the flight did you experience any visual acuity or depth perception problem? Yes____No____. If yes, explain, with comment about effect on subsequent flying performance.

u. Did you experience any eye irritation during this flight? Yes____No____. If yes, explain, with comment about effect on subsequent flying performance.

v. When did you experience the greatest degree of fatigue? ____ hours after take-off.

w. Do you feel that fatigue encountered on this flight significantly affected your flying performance and flying safety? Yes____No____. If yes, explain.

x. What areas of your body were most affected by fatigue?

y. With reference to the period of flight after ten hours, did you experience any of the following: Yes____No____. If yes, explain.

(1) anxiety
(2) ineffectual effort
(3) delayed reaction time
(4) difficulty concentrating
(5) irritability
(6) indifference
(7) faintness or weakness
(8) difficulty making decisions

z. How are any of the adverse pilot-aircraft-mission factors you have indicated above different from these same or similar adverse factors you have previously experienced on flights of shorter duration?

aa. How many more hours do you feel you could have flown safely?

bb. What recommendations do you have, if any, for improvement of your personal equipment, and related pilot comfort gear?

cc. What recommendations do you have for making flights of this type more safe and more comfortable?

dd. What recommendations do you have for improvement in the present crew control concept?

8. Post-flight medical check outlined below will be accomplished; results will be made a part of the permanent records:

a. Weight (nude)

b. Blood pressure (resting)

c. Pulse rate (resting)

d. Body temperature

e. Respiratory rate

f. Deep tendon reflexes

g. Nystagmus

h. Skin turgor and markings.

i. General observations

j. Hemoglobin

k. Eosinophil count

l. Urinalysis - albumin, specific gravity, and microscopic.

m. Additional findings, post-flight, if significant, or if mission is aborted early for medical reasons.

E. FOOD AND LIQUID CONSUMPTION

1. Controlled feeding of a high protein, low residue diet for mission pilots should begin twenty-four hours prior to take-off. The objective of this controlled diet is to provide foods which can be almost completely absorbed from the gastrointestinal tract, thereby leaving a minimum of residue for the formation of feces and intestinal gases.

This obviates the need for frequent defecation and decreases the likelihood of significant gaseous expansion in the intestinal tract. It also provides a more steady state of caloric or energy production. This diet will be mandatory for mission pilots flying ten or more consecutive hours, and strongly recommended for the comfort and well-being of pilots of any mission in excess of six hours.

2. For missions of short duration, the Flight Surgeon will stress upon the mission pilot the necessity of providing proper pre-flight diets at home. Records of all food and liquid intake during the twenty-four hour period prior to flight will be maintained by the mission pilot. This will be submitted to and reviewed by the Flight Surgeon. If significant violations or discrepancies are found by the surgeon, these should be called to the attention of the pilot, so that corrections can be made on subsequent control periods. The pre-flight meal for the mission pilot of flights in excess of ten hours will be prepared at the base hospital until such time as kitchen facilities are provided at North Base. Since time is of the essence, this meal will be made accessible to the pilot by whatever means is available requiring the least amount of time expended by the pilot, whether it be delivering the meal to the sleeping quarters, providing transportation to the hospital, etc. Arrangement for proper diet in forward staging areas will be provided by the detachment Commander by whatever means he deems advisable.

3. The basis for such a diet is meat, rice, eggs, sugar, small amounts of fruit juices, tea, and coffee. Foods allowed are as follows:

a. Beverages: carbonated, coffee, tea.

b. Cereals and cereal products: rice, cream of wheat, noodles, macaroni.

c. Cheese: cottage.

d. Desserts: gelatin, sherbet, angel food cake, sponge cake, sugar cookies.

e. Eggs: soft or hard cooked, scrambled, poached.

f. Fat: butter or margarine, not in excess of three tablespoons per day.

g. Fruit: strained juice, canned, peeled fruit such as peaches or pears, limited amounts.

h. Meat: fowl, fish, beef, veal, liver, chicken, fish (baked or broiled).

i. Soups: clear broth with rice or noodles.

j. Sweets: sugar, jelly, hard candies (in limited amounts).

k. Vegetables: strained, such as tomatoes, peas, carrots, potatoes (baked or boiled); not over one serving per day.

4. Foods to avoid entirely during the twenty-four hour pre-flight period of feeding of the low residue diet are these:

a. Beverages: milk and milk drinks.

b. Breads: coarse or whole grain.

c. Cereals and cereal products: whole grain, popcorn.

d. Cheese: all cheeses, except cottage.

e. Crackers: whole grain.

f. Desserts: all rich desserts, such as pies and pastries.

g. Fats: in excess of three tablespoons per day.

h. Fried foods: all.

i. Fruits: all, except strained fruit juice and canned, peeled fruit, such as peaches or pears.

j. Meat: fowl, fish, if fatty (such as goose or mackerel), fat pork, any tough cuts of meat, lamb and mutton.

k. Nuts

l. Pickles

m. Soups: creamy or spicy.

n. Spices, condiments and highly seasoned foods.

o. Sweets: jams and marmalades; avoid all sugar and sweets in excess.

p. Vegetables: all except strained vegetables such as tomatoes, peas, carrots, and baked or boiled potatoes.

5. Between-meal snacks or drinks other than carbonated beverages, coffee, tea or clear soups, should be avoided.

6. A suggested menu for the pre-flight meal would be as follows:

Food	Size of Serving
Orange juice	4 oz.
Broiled sirloin steak (lean)	4-5 oz.
Scrambled eggs	2
Toast	2 slices
Butter	2 teaspoons
Strawberry jelly	1 tablespoon
Coffee - sugar	

7. If significant time lapses between the last meal prior to take-off and actual flight, immediately prior to take-off and after all preliminary preparations are completed, a high carbohydrate, moderate protein, and low fat meal may be provided, at the driver's discretion. Such a meal is conducive to increased altitude tolerance and in addition, provides needed caloric and liquid requirements. A menu for such a meal which provides approximately 700 calories and 400 milliliters of water is as follows:

Food	Size of Serving (oz.)
Orange sherbet	4
Frozen strawberries	4
Sugar cookies	2
Milk	8 (even though this should be avoided at other times during the control period.)

This snack can be provided with only a minimal amount of preparation and effort.

8. At no time will a driver attempt to accomplish a mission without proper dietary and liquid intake. These factors are especially important to the pilot in missions of extended duration. The feeding program should be aimed toward providing meals with adequate nutrition and fairly high consumer acceptability. In a sense, food can assume a role of stress alleviation in flight, since eating food will be one form of pleasurable activity. Palatability, acceptability, and ease of manipulation of food are extremely important facets of the feeding program, particularly inflight. The food likes and dislikes of each individual driver should be considered in order to provide the most desirable types of food. Each driver, too, should familiarize himself with the food which will be available to him. It is assumed that most, if not all, of the inflight feeding will of necessity be accomplished with the semi-solid foods, packaged in the collapsible squeeze bottles or tubes. Due to the fact that mission lengths will vary considerably, each driver's consumption in flight will be different. The local Flight Surgeon will assure proper intake for each flight and make adjustments accordingly. Menus should provide a total of approximately 2500-3000 calories per day. It is desirable, too, that drivers be maintained in a state of water balance both prior to and during flight; the recommended pre-flight diets provide liberal amounts of liquids and beverages for this purpose. Over-hydration in the immediate pre-flight period, such as the ingestion of excessive amounts of coffee, should be avoided to reduce the likelihood of encountering

difficulties with inflight urination. Alcoholic beverages will not be consumed during the twenty-four hour period prior to take-off because of their dehydrating effect. Water intake should approximate 2500-3000 milliliters per day. This includes that in juices, beverages, and any other fluids in the food or liquids consumed.

VIII. Any pilot demonstrating apparent and repeated disregard for the measures proposed in this manual will be cautioned by the Flight Surgeon that such action will subject him to consideration for dismissal from the project. If, after adequate warning, this disregard continues, Headquarters will be notified by the Flight Surgeon, through the detachment Commander, and appropriate action will be taken.

IX. Oxygen consumption should be monitored as closely as possible, especially on flights in excess of ten hours. This information can be used in evaluating each pilot's individual oxygen consumption rate as well as determine adequacy of oxygen supply for any proposed mission.

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